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Dudley Cordon 2002

March 2003

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Dudley Cordon Survey 2002

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Summary

The following is a summary of the information contained in this report. Estimates of people have only been calculated for the inbound and outbound morning peak periods. The estimates are calculated using manual surveys. The extent of these surveys defines the extent of information available. For details on methodology and a breakdown of the time periods, see the main report.

0730-0930 inbound

total vehicles	24,435
estimated pedal cycles	56
estimated bus	330
estimated light vehicles	22,803
estimated goods vehicles	1,246
estimated people (light vehs)	27,379
estimated people (goods vehs)	1,496

0730-0930 outbound

total vehicles	20,068
estimated pedal cycles	51
estimated bus	289
estimated light vehicles	18,524
estimated goods vehicles	1,204
estimated people (light vehs)	20,996
estimated people (goods vehs)	1,507

1000-1200 inbound

total vehicles	17,000
estimated pedal cycles	13
estimated bus	256
estimated light vehicles	15,189
estimated goods vehicles	1,542

1000-1200 outbound

total vehicles	16,967
estimated pedal cycles	21
estimated bus	292
estimated light vehicles	15,198
estimated goods vehicles	1,456

1630-1830 inbound

total vehicles	21,183
estimated pedal cycles	69
estimated bus	241
estimated light vehicles	20,447
estimated goods vehicles	426

1630-1830 outbound

total vehicles	24,102
estimated pedal cycles	80
estimated bus	335
estimated light vehicles	23,252
estimated goods vehicles	435

1 Introduction

This report is being undertaken as part of the Local Transport Plan monitoring process. The purpose of the report is to give an indication of the level of vehicular activity in the town centre, to indicate existing and future levels of transport demand and to monitor the effects of transport policy. The surveys and analysis have been undertaken by the **jdt** and Dudley M.B.C..

2 Methodology

Counts of vehicles crossing a cordon around Dudley Town Centre are undertaken at two year intervals using Automatic Traffic Counters (ATCs) installed on all major and most minor roads crossing the cordon. The counts record vehicles continuously, by direction, for a seven day period. The location of the sites is shown in figure 11.

Four sites are also surveyed manually by Dudley M.B.C. staff. This data is used to estimate the modal split of the automatic data and also to estimate the number of people travelling into the town centre by vehicle.

A complimentary bus cordon survey is undertaken by **jdt**, into which this report feeds.

3 Background

The 2002 Dudley Cordon ATC survey was undertaken in the week beginning 25th November. Care was taken to avoid school holidays and the Christmas shopping seasons. In future, every effort will be made to keep the cordon survey to the same week in November.

The exact position of the automatic counts are listed in Appendix 1.

4 Diary and Quality of Data Collection

Unfortunately, the data from the manual surveys, which were carried out at the same time as the ATCs, was only split down into 6 categories of vehicles instead of the normal 12 categories. In order to establish a light/heavy vehicle split comparable with other cordon surveys in the West Midlands, the LGV<3T category was split into light and heavy vehicles based on 12 category counts at similar sites in Dudley.

Flows seem to follow The Department of Transport's Traffic Appraisal Manual (TAM) which quotes +/- 5% as being the error margin for a 95% confidence interval of the true flows for an automatic count taken over a period of more than 12 hours (TAM 1981 6.2.5). The corresponding error margin for a manual count taken over a short period of time is +/- 10% (TAM 1981 6.3.5).

5 Results

In the table below the figures for the number of vehicles crossing the cordon line in both directions during the morning peak period are presented. The period considered to be the morning peak has been taken as 0730 - 0930, in order to provide consistency with previous years, and allowing trends in vehicles entering and leaving Dudley Town Centre to be analysed.

Table 1 No. of Vehicles Crossing the Cordon Line in the Morning Peak Period (0730 - 0930)

	1996	1998	2000	2002
Inbound Total	24,705	23,301	24,785	24,435
Outbound Total	18,462	18,649	19,496	20,068

From these figures, the total number of vehicles crossing the cordon towards the town centre during this time period remained at approximately the same levels as 2000.

The figures for the 1000-1200 time period are given in Table 2. Again, this time period has been considered as it is the off-peak time period that has been surveyed in previous years.

Table 2 No. of Vehicles Crossing the Cordon Line in the Off-Peak Period (1000 – 1200).

	1996	1998	2000	2002
Inbound Total	18,217	15,530	16,760	17,000
Outbound Total	15,130	15,216	16,582	16,967

Off-Peak, figures followed a similar pattern to the peak figures with flows remaining at about the same level as 2000.

Table 3 Total Vehicles by Time Period on an Average Weekday, 1998 - 2002

	0730 - 0930	1000- 1200	1600- 1800	0700- 1900 (12 hr)	24 hour
1998					
Inbound 1998	23,299	15,530	19,563	108,544	135,194
% of 24hr	17.2	13.8	14.5	80.3	100
Outbound 1998	18,645	15,216	23,726	110,654	140,135
% of 24hr	13.3	10.9	16.9	79.0	100
Net 1998(Inbound minus Outbound)	4,654	314	-4,163	-2,110	-4,941
2000					
Inbound 2000	24,785	16,760	21,555	117,627	147,029
% of 24 hr	16.9	11.4	14.7	80.0	100
Outbound 2000	19,496	16,582	23,516	115,086	145,312
% of 24 hr	13.4	11.4	16.2	79.2	100
Net 2000(Inbound minus Outbound)	5,289	178	-1,961	2541	1717
2002					
Inbound 2002	24,435	17,000	21,870	118,856	149,276
% of 24 hr	16.4	11.4	14.7	79.6	100
Outbound 2002	20,068	16,967	24,496	119,091	151,434
% of 24 hr	13.3	11.2	16.2	78.6	100
Net 2002(Inbound minus Outbound)	4367	33	-2,626	-235	-2,158

The figures in Table 3 show that 16.4% of traffic flowing into the town centre on a typical day is crossing the cordon line between the hours of 7.30am and 9.30am. This corresponds with the figures for the outbound traffic between 4pm and 6pm which account for 16.2% of a daily outbound flow.

The off-peak time period considered (1000-1200) shows 11.4% of the daily traffic travelling into the town centre with 11.2% travelling out of the centre .

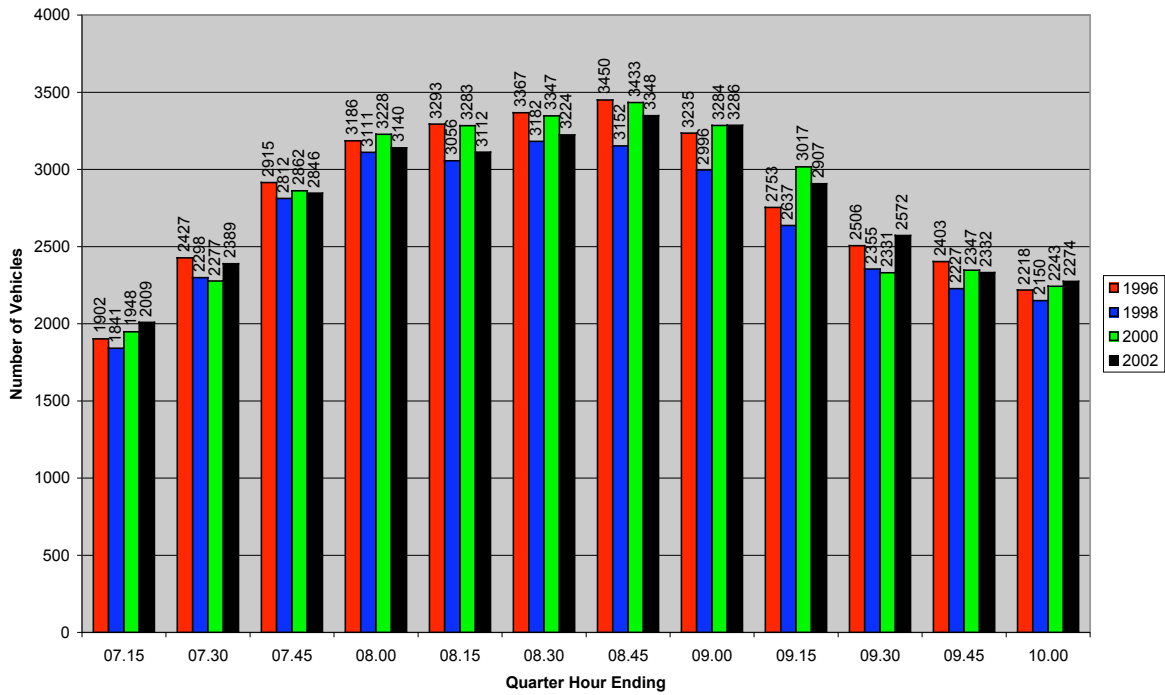
Around 80% of an average day's traffic is crossing the cordon during the main 12-hr day.

The net figure of 4,367 for the morning peak period gives some idea of the amount of the journey to work traffic to the town centre. Full figures for the net vehicles in the town centre are given in Table 5 by hour and Table 6 by station.

The time periods considered have been kept consistent with the time periods surveyed in previous years but, in future, any time period could be considered.

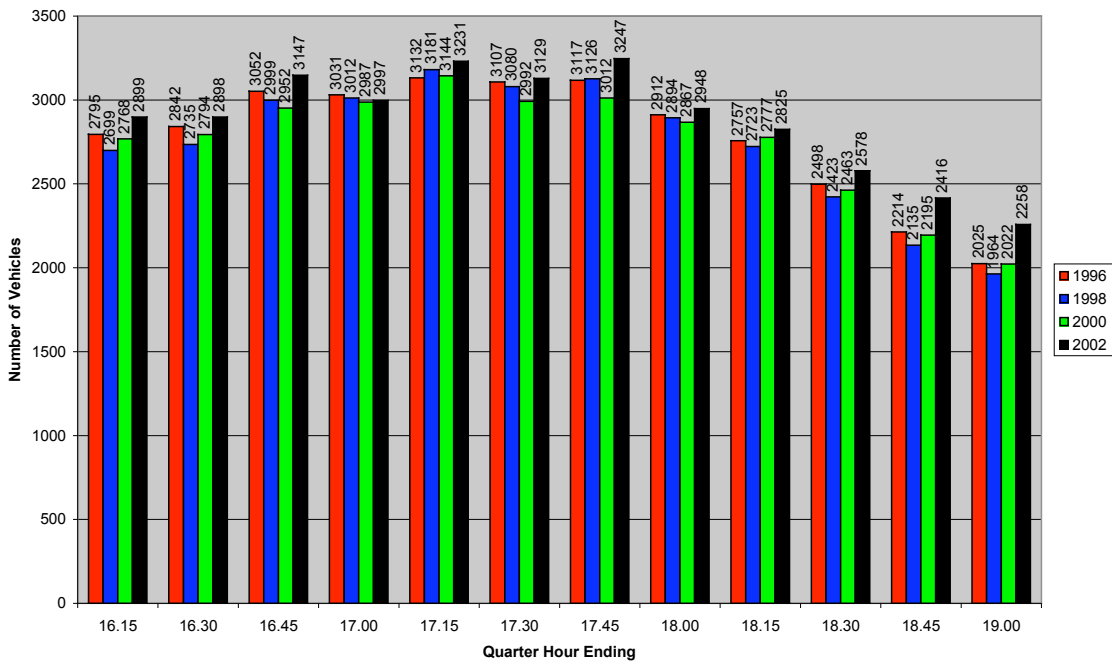
Figure 1 and 2 give a pictorial view of traffic flow in the two peak time periods, by quarter-hour periods.

Figure 1 Inbound Morning Peak: Vehicle Volumes by Quarter Hour



As expected, the graph shows the number of vehicles entering the town centre gradually increasing from 7am, with the peak number between 8.30 – 8.45am.

Figure 2 Outbound Evening Peak: Vehicle Volumes by Quarter Hour



The evening peak hour for vehicles leaving the town centre is from 16.45 – 17.45 with the highest quarter hour period being 17.30-17.45.

The following Figure 3 and Figure 4 present the 24 hour variations in Total Traffic for the inbound and outbound data.

Figure 3 Inbound 24 Hour Variations in Total Traffic

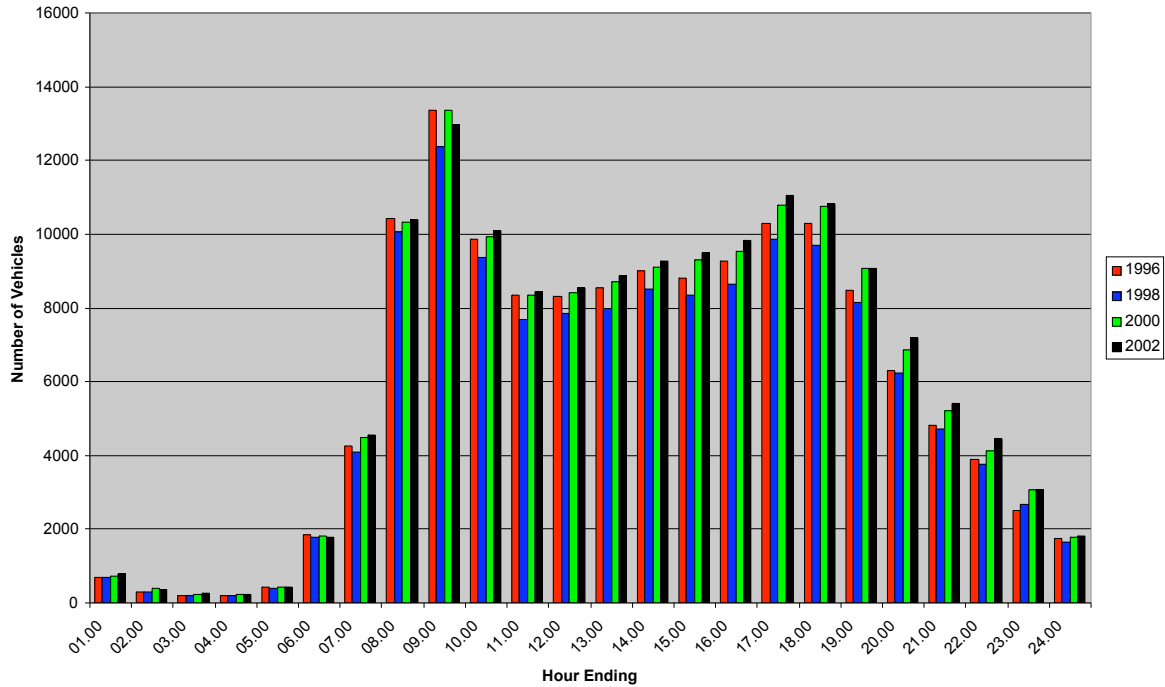
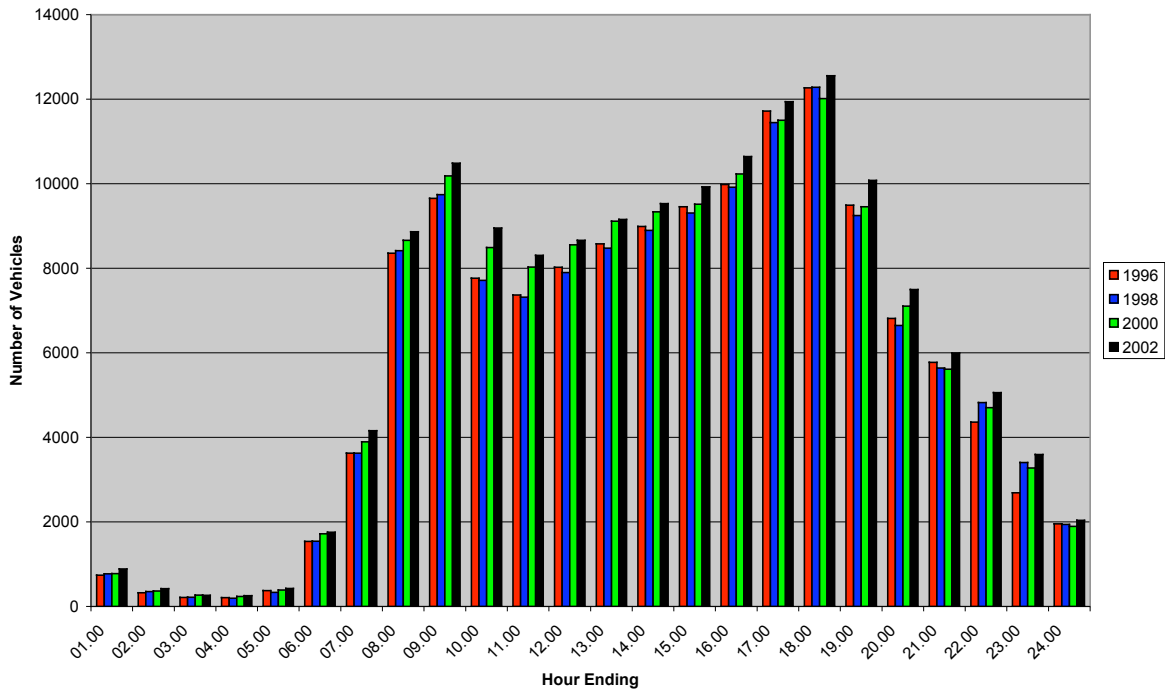
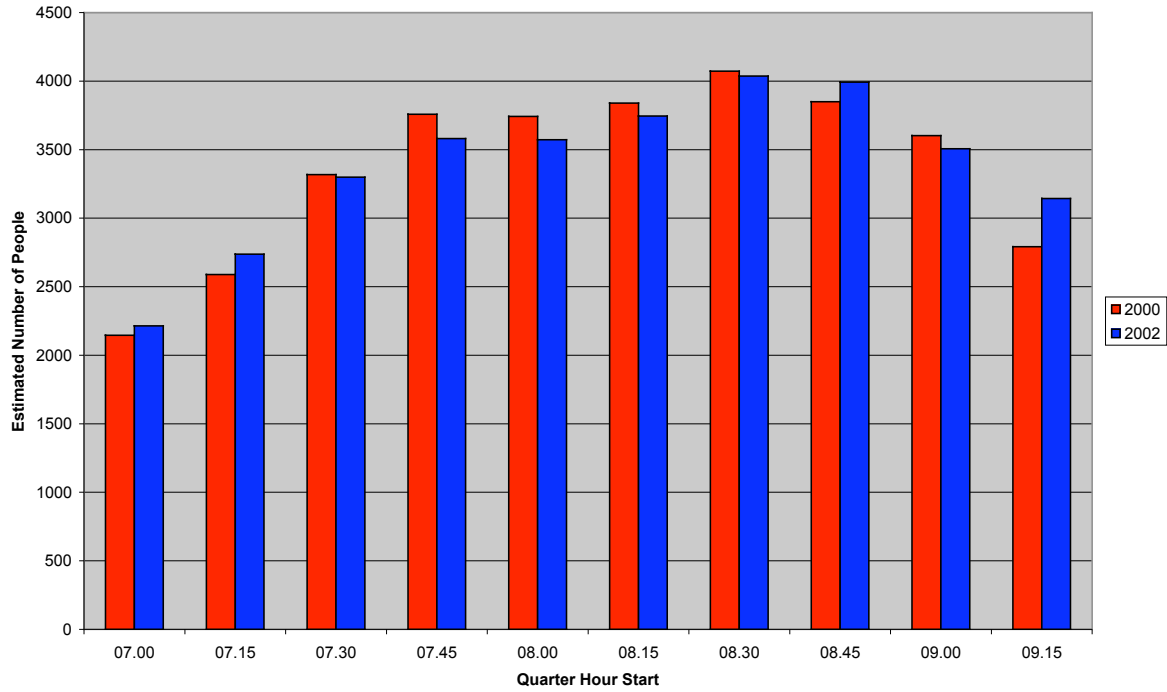


Figure 4 Outbound 24 Hour Variations in Total Traffic



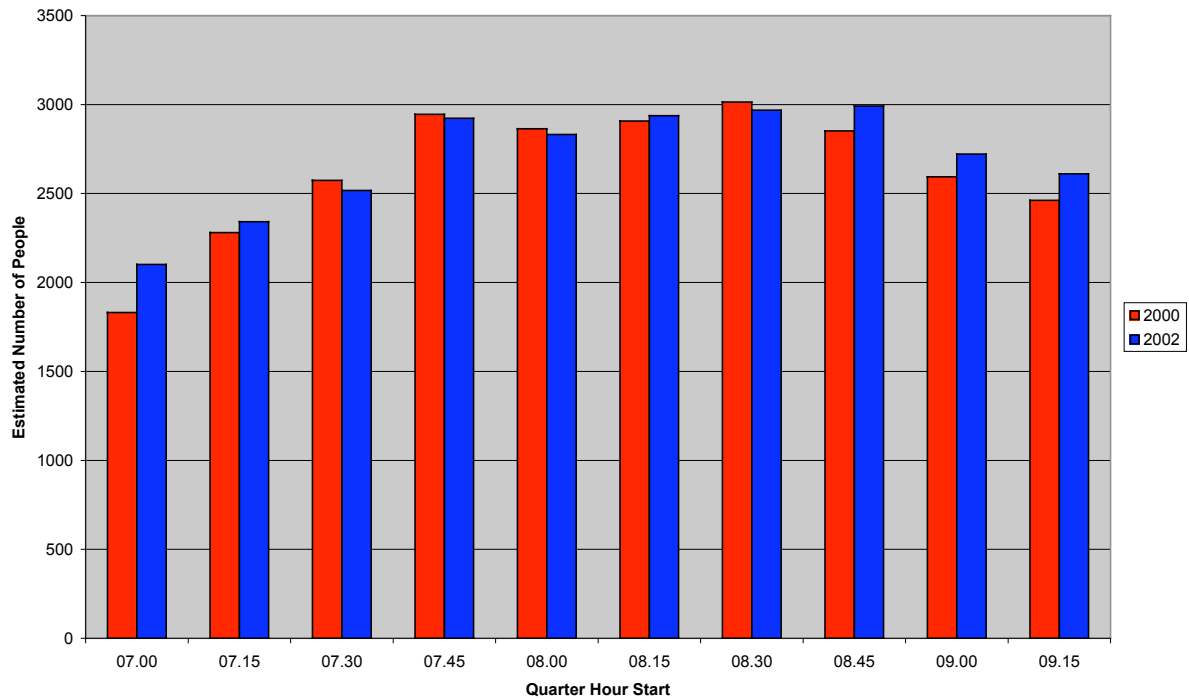
5.1 Occupancy Levels

Figure 5 Estimate of Numbers of Persons Travelling Inbound - Morning Peak



Figures 5 and 6 show the estimated numbers of persons crossing the cordon calculated from the occupancy counts at the four manual sites and the number of vehicles counted automatically per time period.

Figure 6 Estimate of Numbers of Persons Travelling Outbound - Morning Peak



5.2 Daily and Hourly Variations
Table 4 Variations in Traffic Flow by Time of Day, 2002

	MON	TUE	WED	THUR	FRI	SAT	SUN
Inbound							
0730-0930	1.017	1.016	1.019	1.010	0.939	0.426	0.118
1000-1200	0.982	0.994	1.016	1.004	1.005	1.025	0.706
1600-1800	1.002	1.029	1.028	1.030	0.912	0.670	0.586
0700-1900	0.994	1.004	1.010	1.012	0.980	0.759	0.547
0000-2400	0.978	0.998	1.007	1.024	0.992	0.774	0.554
Outbound							
0730-0930	0.997	1.000	1.008	1.008	0.989	0.449	0.081
1000-1200	0.977	0.994	1.003	1.002	1.024	1.017	0.479
1600-1800	1.011	1.010	0.991	1.004	0.984	0.672	0.474
0700-1900	0.989	0.998	0.997	0.997	1.019	0.770	0.450
0000-2400	0.972	0.993	0.993	1.013	1.029	0.788	0.477

The figures in Table 4 give the proportions that each day contributes to an average week day (Mon - Fri), for each of the popular time periods. These figures can be used to factor a count taken on any day to an average week day's count. The figures also show which days have the heaviest flows during each time period.

Figure 7 Net Loss/gain in Vehicles Inside the Cordon, by Hour.

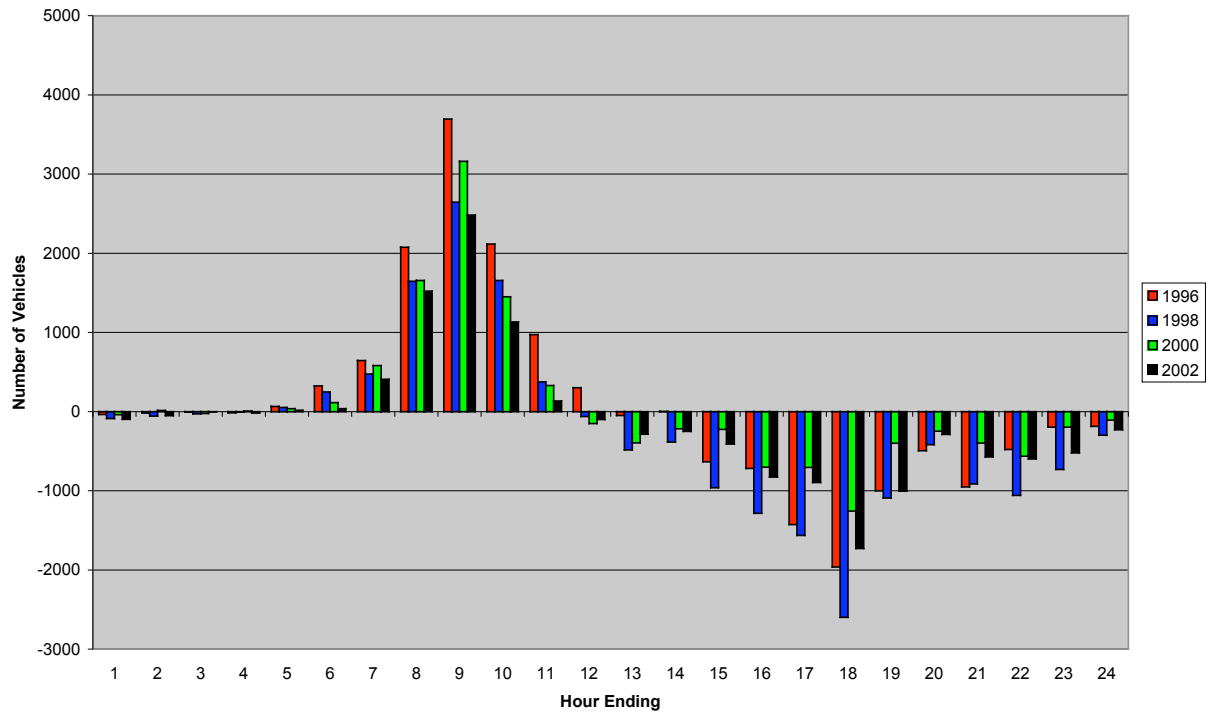


Figure 8 Net Accumulation of Vehicles Inside Cordon Area, by Hour.

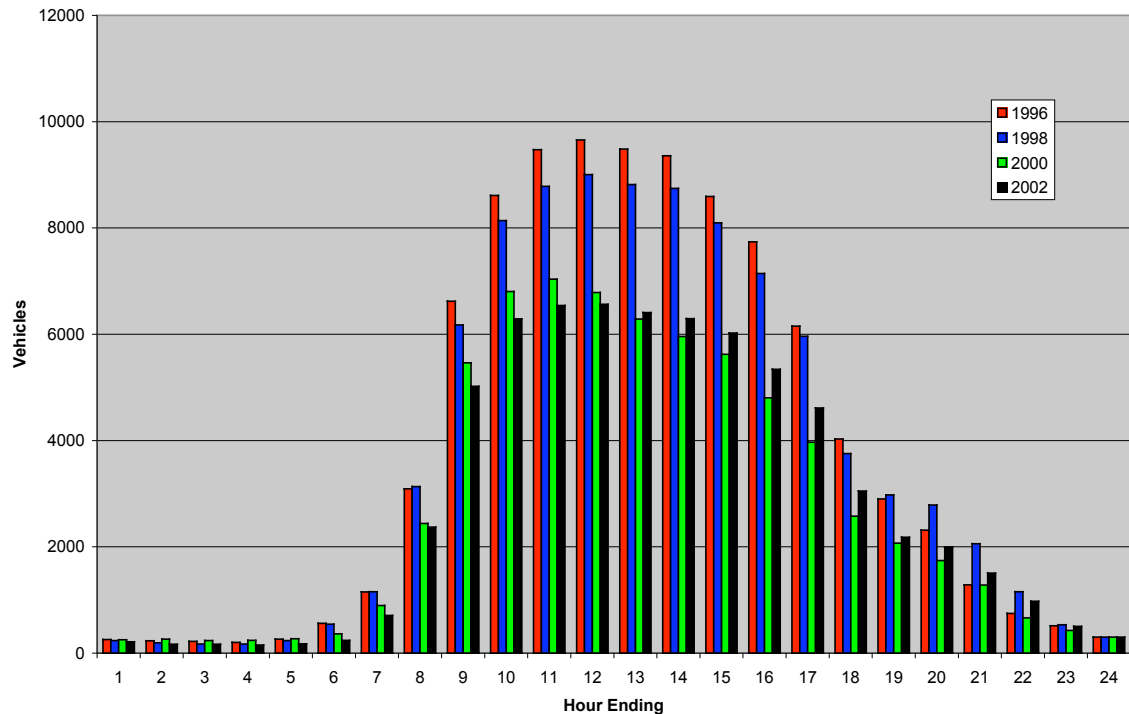


Figure 7 shows the net loss or gain to the town centre of vehicles throughout an average weekday. Stationary vehicles are not taken into account, only the movement of vehicles across the cordon line. Figure 8 shows the net accumulation of vehicles inside the cordon area by hour. The figures used for Figure 7 and Figure 8 are given in Table 5.

Table 5 Net Loss/Gain and Accumulation in Vehicles, by Hour 2002.

Hour Ending	Inbound	Outbound	Net Loss/Gain	Accumulation*
1.00	787	885	-98	214
2.00	371	422	-51	169
3.00	262	265	-3	169
4.00	233	252	-19	154
5.00	442	426	16	176
6.00	1793	1755	38	240
7.00	4563	4156	407	709
8.00	10384	8862	1522	2369
9.00	12969	10487	2482	5020
10.00	10085	8953	1132	6289
11.00	8440	8306	134	6543
12.00	8560	8661	-101	6565
13.00	8870	9155	-285	6410
14.00	9277	9528	-251	6294
15.00	9513	9924	-411	6022
16.00	9816	10643	-827	5342
17.00	11045	11941	-896	4611
18.00	10825	12554	-1729	3050
19.00	9072	10077	-1005	2182
20.00	7207	7496	-289	1998
21.00	5423	5997	-574	1506
22.00	4461	5059	-598	977
23.00	3071	3592	-521	503
24.00	1807	2038	-231	300

* N.B. In calculating accumulation of vehicles, the ratio of inbound to outbound vehicles was balanced and a nominal 300 vehicles were added in as an estimate of vehicles remaining inside the cordon overnight.

5.3 Patterns of Travel

The figures in Table 6 show the number of vehicles travelling into the town centre and out of the town centre by each individual site on an average weekday. By examining these figures, it is possible to determine some patterns of behaviour in the traffic. For example, people may prefer to use one road to enter the town centre in the mornings and another to leave the town at night.

Table 6 Net Loss/Gain in Vehicles on an Average Weekday, by Site

Site	Location	2000	2000	Net	2002	2002	Net
		inbound	outbound	gain	inbound	outbound	gain
DU01	Tipton Road	11400	10200	1200	12193	10768	1425
DU02	Birmingham Road	22318	23126	-808	23671	24151	-480
DU04	Priory Road	7693	7290	403	8119	8387	-268
DU05	The Broadway	4949	3675	1274	4349	3629	720
DU08	Himley Road	9469	10082	-613	9389	10144	-755
DU10	High Street Pensnett	13277	15963	-2686	12333	16792	-4459
DU11	Stourbridge Road	11566	11667	-101	12297	12134	163
DU12	Pedmore Road	12483	10878	1605	13195	10081	3114
DU13	Peartree Lane	6041	7476	-1435	6553	8233	-1680
DU14	Cinder Bank	14743	14051	692	16437	14238	2199
DU16	New Rowley Road	5139	5218	-79	5162	5288	-126
DU17	Buffery Road	7049	4643	2406	6291	4958	1333
DU18	Oakham Road	5170	5957	-787	4793	5527	-734
DU19	Highland Road	11035	11687	-652	11703	12143	-440
DU20	Dibdale Street	760	736	24	883	860	23
DU21	St. Johns Road	597	162	435		1135	-1135
DU22	Lister Road	3340	2502	838	3225	3200	25

5.4 Mode of Travel

The four manual surveys give us an indication of the mode of travel.

Table 7 shows a summary of the data collected from the four manually surveyed sites. For the purpose of this table, light vehicles includes motorcycles, cars & taxis, and Goods Vehicles less than 1.5 tonnes. The heavy vehicle category includes all goods vehicles greater than 1.5 tonnes.

In Table 7 the percentage the vehicle category contributes to the total vehicles in that hour is given in brackets. In Tables 8 and 10 we have multiplied these percentages by the number of vehicles counted automatically, giving an indication of the number of each type of vehicle.

Table 7 Summary of inbound modal data from manual surveys

Time Starting	Total Vehs	Pedal Cycles	Bus & Coach	Total Light Vehicles	Total Heavy Vehicles
07:00	3706	14(0.38%)	76(2.05%)	3400(91.74%)	216(5.83%)
08:00	4714	8(0.17%)	61(1.29%)	4423(93.83%)	222(4.71%)
09:00	4101	3(0.07%)	58(1.41%)	3758(91.63%)	282(6.88%)
10:00	3317	3(0.09%)	54(1.63%)	2959(89.22%)	301(9.06%)
11:00	3316	2(0.06%)	46(1.39%)	2967(89.47%)	301(9.08%)
12:00	3430	4(0.12%)	58(1.69%)	3063(89.30%)	305(8.90%)
13:00	3637	6(0.16%)	53(1.46%)	3300(90.74%)	278(7.64%)
14:00	3639	0(0%)	50(1.37%)	3282(90.18%)	307(8.45%)
15:00	3725	10(0.27%)	64(1.72%)	3401(91.31%)	250(6.71%)
16:00	4178	16(0.38%)	60(1.44%)	3949(94.51%)	153(3.67%)
17:00	4517	16(0.35%)	44(0.97%)	4370(96.75%)	87(1.93%)
18:00	3896	6(0.15%)	57(1.46%)	3771(96.79%)	62(1.59%)
Total	46176	88(0.19%)	681(1.47%)	42642(92.35%)	2765(5.99%)

Table 8 Estimated inbound mode of transport figures

Time Starting	No. Vehs counted automatically	estimated ped cyc	estimated bus	estimated light vehs	estimated heavy vehs
07:00	10384	39	213	9526	606
08:00	12969	22	168	12168	611
09:00	10085	7	143	9241	694
10:00	8440	8	137	7530	765
11:00	8560	5	119	7659	777
12:00	8870	10	150	7920	789
13:00	9277	15	135	8418	709
14:00	9513	0	131	8579	804
15:00	9816	26	169	8963	658
16:00	11045	42	159	10439	405
17:00	10825	38	105	10473	208
18:00	9072	14	133	8781	144
Total	118856	228	1761	109697	7170

Figure 9 Estimated inbound mode of transport figures

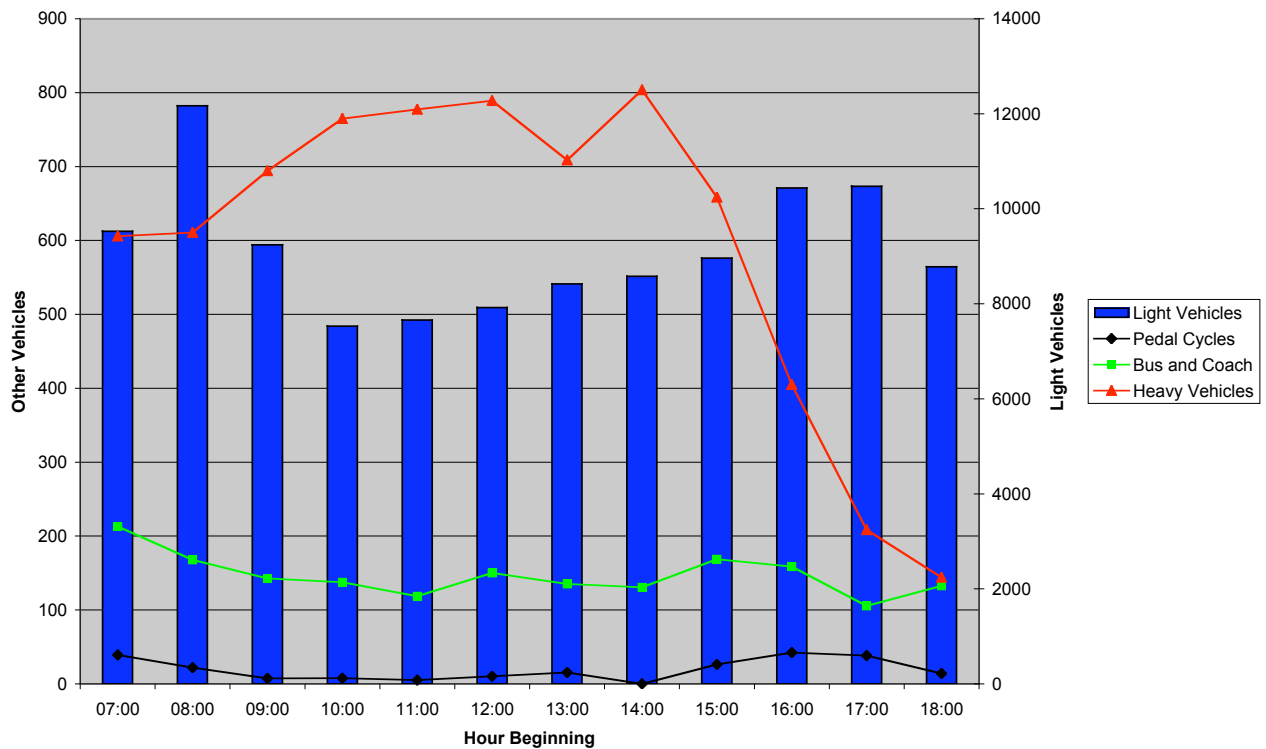


Figure 9 graphically illustrates the figures in Table 8. The lines in the graph are to be read from the right hand axis and the bar (light vehicles) from the left hand axis. The corresponding figures for manually counted outbound vehicles are given in Table 9, and estimated figures in Table 10 and Figure 10.

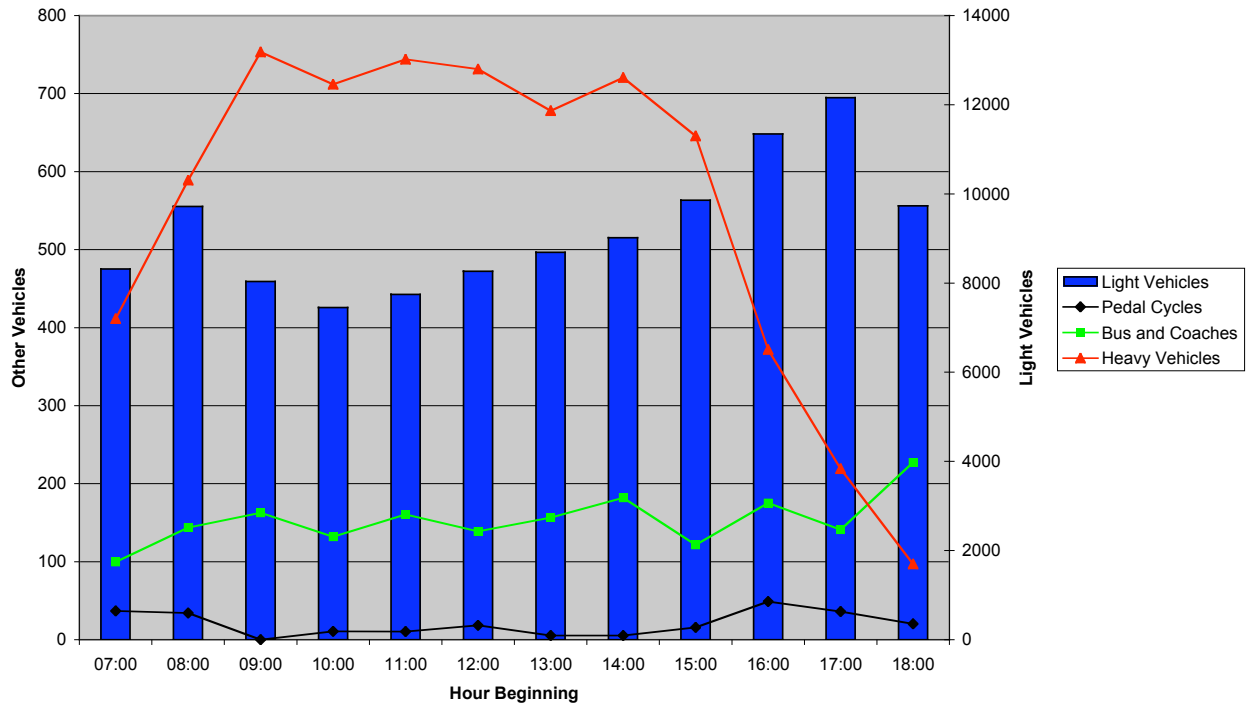
Table 9 Summary of outbound modal data from manual surveys

Time Starting	Total Vehs	Pedal Cycles	Bus & Coach	Total Light Vehicles	Total Heavy Vehicles
07:00	4097	17(0.41%)	46(1.12%)	3844(93.82%)	190(4.64%)
08:00	4308	14(0.32%)	59(1.37%)	3993(92.69%)	242(5.62%)
09:00	3466	0(0.0%)	63(1.82%)	3111(89.77%)	292(8.41%)
10:00	3086	4(0.13%)	49(1.59%)	2769(89.71%)	264(8.57%)
11:00	3345	4(0.12%)	62(1.85%)	2992(89.44%)	287(8.59%)
12:00	3490	7(0.20%)	53(1.52%)	3151(90.29%)	279(7.99%)
13:00	3655	2(0.05%)	60(1.64%)	3333(91.19%)	260(7.11%)
14:00	3655	2(0.05%)	67(1.83%)	3321(90.85%)	265(7.26%)
15:00	4025	6(0.15%)	46(1.14%)	3729(92.64%)	244(6.07%)
16:00	4154	17(0.41%)	61(1.47%)	3947(95.01%)	129(3.11%)
17:00	4541	13(0.29%)	51(1.12%)	4398(96.84%)	79(1.75%)
18:00	3988	8(0.20%)	90(2.26%)	3852(96.58%)	38(0.96%)
Total	45810	94(0.21%)	707(1.54%)	42438(92.64%)	2571(5.61%)

Table 10 Estimated outbound mode of transport figures

Time Starting	No. Vehs counted automatically	estimated ped cyc	estimated bus	estimated light vehs	estimated heavy vehs
07:00	8862	37	100	8314	411
08:00	10487	34	144	9720	589
09:00	8953	0	163	8037	753
10:00	8306	11	132	7451	712
11:00	8661	10	161	7746	744
12:00	9155	18	139	8266	731
13:00	9528	5	156	8689	678
14:00	9924	5	182	9016	720
15:00	10643	16	122	9860	646
16:00	11941	49	175	11345	372
17:00	12554	36	141	12158	219
18:00	10077	20	227	9732	97
Total	119091	242	1841	110336	6672

Figure 10 Estimated outbound mode of transport figures



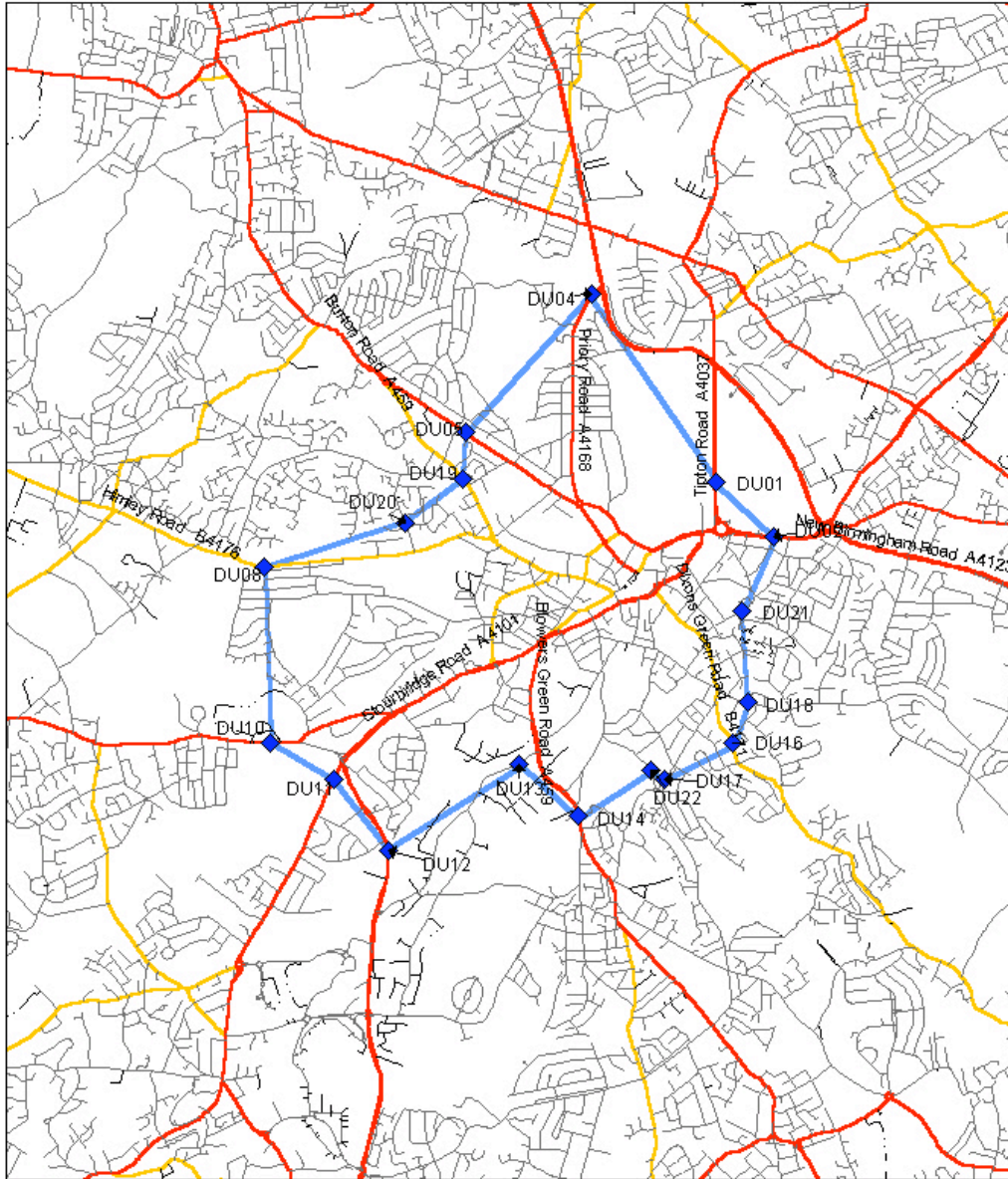
6 Appendix 1 Position Of Cordon Sites

The sites were chosen so as to create a closed cordon. The sites remain in the same position as those carried out manually in previous years. The map overleaf shows roughly where the sites were positioned, a description of the exact locations are given below.


Table A1. 1 Description of the Position of the Cordon Sites

Site	Location	Exact Position
DU01	Tipton Road	north of Castle Hill
DU02	Birmingham Road	near Arras Road
DU04	Priory Road	west of New Birmingham Road
DU05	The Broadway	south of Limepit Lane
DU08	Himley Road	east of Milking Bank
DU10	High Street Pensnett	west of Kingswinford Road
DU11	Stourbridge Road	north of Holly Street
DU12	Pedmore Road	south of Cochrane Road
DU13	Peartree Lane	west of Cinder Bank
DU14	Cinder Bank	south of Jubilee Terrace
DU16	New Rowley Road	south of Oakham Avenue
DU17	Buffery Road	between Lister Road and School Drive
DU18	Oakham Road	between Bennetts Hill and Oakham Avenue
DU19	Highland Road	between Dibdale Road and Nith Place
DU20	Dibdale Street	between Newey Street and Corser Street
DU21	St. Johns Road	between Price Street and Alton Grove
DU22	Lister Road	between Buffery Road and Fairfield Road

Figure 11 Location of Dudley ATC Sites



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 \\Bdc01\users\47995\monitoring\Dudley Cordon 2000\dusites.wor

Title							Telephone 0121-237-4002	
Position of sites within Dudley Cordon					Mott MacDonald Limited		Fax 0121-237-4003	
					Canterbury House			
					85 Newhall Street, Birmingham, B3 1LZ			
Date	Drawn	Checked	Approved	Status	Drawing no.	Rev.		
11/01/01	JS	BWS	BWS	Final	47995/BA07/01	A		

7 Appendix 2 Comparison of Manual and Automatic Counts

Four of the automatic sites were manually surveyed for the 12 hour period (0700 – 1900) on one weekday each.

The figures presented here compare the results of the manual surveys with the results of the automatic surveys (average weekday) for certain time periods.

Table A2. 1 DU02 Birmingham Road (Tuesday)

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	3,235	3,184	3,307	2,617
16.30 - 18.30	3,778	3,553	3,069	2,839
07.00 - 19.00	18,801	18,315	18,287	17,279

Table A2. 2 DU04 Priory Road (Wednesday)

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	1,278	1,030	1,697	1,521
16.30 - 18.30	1,353	1,483	2,127	1,503
07.00 - 19.00	6,034	6,601	7,768	6,731

Table A2.3 DU10 High Street – Pensnett (Thursday)

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	2,388	2,346	1,475	2,146
16.30 - 18.30	1,469	1,502	1,761	2,425
07.00 - 1900	9,847	9,835	9,318	13,079

Table A2.4 DU14 Cinder Bank (Friday)

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	2,092	2,381	2,019	2,049
16.30 - 18.30	2,045	2,404	1,886	1,976
07.00 - 1900	11,494	13,529	10,437	11,381